

CLAIMS

1. A constant-voltage circuit for
5 converting an input voltage provided to an input terminal of said constant-voltage circuit into a predetermined constant voltage, and for providing said constant voltage to a load, comprising:
- a reference voltage generating circuit
10 unit for generating and outputting a predetermined reference voltage;
- an output voltage detecting unit for detecting said constant voltage, and generating and outputting a voltage that is proportional to said
15 detected voltage;
- an output transistor for outputting a current provided from said input terminal to said load according to a control signal;
- an error amplifying circuit unit for
20 providing said control signal for controlling operations of said output transistor so that said proportional voltage becomes equal to said reference voltage;
- an output current detecting unit for
25 detecting said current output from said output

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transistor, and generating and outputting a proportional current that is proportional to the detected current;

a first resistance connected to said
5 output voltage detecting unit;

a proportional current supply circuit unit for supplying said proportional current, which is proportional to the output current, from said output current detecting unit to said first resistance;

10 a second resistance connected between said output transistor and said load; and

a capacitor connected to a junction where said second resistance and said load are connected; wherein said second resistance and said capacitor
15 constitute a phase compensating circuit unit for carrying out phase compensation for said error amplifying circuit unit.

2. The constant-voltage circuit as claimed
20 in claim 1, wherein a resistance value of said first resistance is set such that a product of the resistance value and said proportional current provided by said output current detecting unit becomes equal to or less than a voltage drop through
25 said second resistance.

3. The constant-voltage circuit as claimed
in claim 1, wherein said output current detecting
unit comprises a transistor for output current
5 detection for outputting said proportional current
that is proportional to the current output from said
output transistor according to the control signal
from said error amplifying circuit unit using a
current provided to said input terminal.

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4. The constant-voltage circuit as claimed
in claim 3, wherein said proportional current supply
circuit unit comprises a current mirror circuit, to
which the current output from the said transistor
15 for output current detection is provided.

5. The constant-voltage circuit as claimed
in claim 4, wherein said proportional current supply
circuit unit comprises a stack type current mirror
20 circuit.

6. The constant-voltage circuit as claimed
in claim 4, wherein said proportional current supply
circuit unit comprises two current mirror circuits
25 that are cascaded.

7. The constant-voltage circuit as claimed
in claim 4, wherein said proportional current supply
circuit unit comprises a Wilson type current mirror
5 circuit.

8. The constant-voltage circuit as claimed
in claim 4, wherein said proportional current supply
circuit unit comprises:

10 an operation amplifying circuit, wherein
the output of said output transistor is provided to
one of input terminals of the operation amplifying
circuit, and the output of said transistor for
output current detection is provided to another
15 input terminal of the operation amplifying circuit;

a current control transistor for
controlling the current output from said transistor
for output current detection according to an output
of said operation amplifying circuit, and for
20 outputting a control current; and

a current mirror circuit that inputs said
control current output by said current control
transistor, and for outputting a current
proportional to said control current to said first
25 resistance.

9. The constant-voltage circuit as claimed in claim 1, wherein an internal resistance of said capacitor is small.

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10. The constant-voltage circuit as claimed in claim 7, wherein said capacitor is a ceramic capacitor.

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11. The constant-voltage circuit as claimed in claim 1, wherein a resistance value of said second resistance is between 50 m Ω and 10 Ω .

12. The constant-voltage circuit as claimed in claim 1, wherein said second resistance is formed by wiring resistance.

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13. The constant-voltage circuit as claimed in claim 1, wherein said reference voltage generating circuit unit, the output voltage detecting unit, the output transistor, the error amplifying circuit unit, the output current detecting unit, the first resistance, and the proportional current supply circuit unit are integrated as an IC.

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14. The constant-voltage circuit as
claimed in claim 1, wherein said reference voltage
generating circuit unit, the output voltage
5 detecting unit, the output transistor, the error
amplifying circuit unit, the output current
detecting unit, the first resistance, the
proportional current supply circuit unit, and the
second resistance are integrated as an IC.

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15. The constant-voltage circuit as
claimed in claims 1, wherein said first resistance
is connected between said output transistor and said
output voltage detecting unit.

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